



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,419	06/20/2003	Hongxin Song	MP0275	6709
26200	7590	12/07/2006	EXAMINER	
FISH & RICHARDSON P.C. P.O BOX 1022 MINNEAPOLIS, MN 55440-1022			RIZK, SAMIR WADIE	
			ART UNIT	PAPER NUMBER
			2133	
DATE MAILED: 12/07/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/600,419

Applicant(s)

SONG ET AL.

Examiner

Sam Rizk

Art Unit

2133

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-75 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-75 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

- Response to the applicant's amendment dated 9/27/2006
- Claims 1-75 have been submitted for examination
- Claims 1-75 have been rejected

### *Response to Arguments*

1. Applicant's arguments, see pages 2-5, filed on 9/27/2006, with respect to the rejection(s) of claim(s) 1-21 and 53-63 under 35 USC § 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Takashi et al. US patent no. 6,519,715 (Hereinafter Takashi).
2. In regard to claims 22-52 and 64-75 a new ground(s) of rejection is made in view of Takashi, previously allowed claims 22-52 and 64-75 filed on 6/29/2006 are withdrawn.

### *Claim Rejections - 35 USC § 101*

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claim 22 is rejected under 35 U.S.C. 101 because the claim invention is directed to non-statutory subject matter. Each limitation in claim 1 comprises an abstract algorithm that can be carried by hand or computer software program element and is **not tangibly embodied**. Abstract algorithms are non-statutory. **Interpreting** signal and **averaging** multiple signals are mathematical algorithms that are non-statutory.

Art Unit: 2133

4. Claim 23 is rejected under 35 U.S.C. 101 because the claim invention is directed to non-statutory subject matter. Each limitation in claim 1 comprises an abstract algorithm that can be carried by hand or computer software program element and is **not tangibly embodied**. Abstract algorithms are non-statutory. **Sampling** signal and **detecting discrete** values are mathematical algorithms that are non-statutory.
5. Claim 64 is rejected for the same reasons as per claim 22.
6. Claim 65 is rejected for the same reasons as per claim 23.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-75 are rejected under 35 U.S.C. 102(e) as being anticipated by Takashi.
8. In regard to claim 1, Takashi teaches:
  - (Original) A signal processing apparatus comprising:  
(Note: FIG. 35 in Takashi)
  - an input to receive a signal;

(Note: FIG. 35, reference character (adin) in Takashi)

- a buffer responsive to the input to store the signal;

(Note: FIG. 35, reference character (6) in Takashi)

- detector responsive to the input to interpret the signal as discrete values; and

(Note: col. 27, line (50) in Takashi)

- an averaging circuit responsive to the buffer and the detector to cause interpretation, by the detector during a retry mode, of a new signal comprising an average of a previous signal stored in the buffer and a current signal.

(Note: FIG. 35, reference character (250) and col. 27, lines (50-55) in Takashi)

9. In regard to claim 2, Takashi teaches:

- (currently amended.) The apparatus of claim 1, wherein the signal from the input comprises a read signal received from storage medium.

(Note: FIG. 1, reference character (54) in Takashi)

10. In regard to claim 3, Takashi teaches:

- (currently amended) the apparatus of claim 1, wherein the signal from the input comprises an analog signal, the apparatus further comprises a filter and analog to digital converter (ADC) coupled between the input and the detector.

(Note: FIG.1, reference characters (1), (3) and (4) in Takashi)

11. In regard to claim 4, Takashi teaches:

- (original) The apparatus of claim 3, wherein the buffer is coupled between the ADC and the filter.

(Note: FIG.1, reference characters (4), (6) and (10) in Takashi)

12. In regard to claim 5, Takashi teaches:

- (original) The apparatus of claim 3, wherein the buffer is coupled between the filter and the detector.

(Note: FIG.1, reference characters (6), (10) and (17) in Takashi)

13. In regard to claim 6, Takashi teaches:

- (original) The apparatus of claim 3, wherein the filter comprises a finite impulse response (FIR) digital filter coupled between the ADC and the detector.

(Note: FIG. 8 and col. 8, line 42 in Takashi)

14. In regard to claim 7, Takashi teaches:

- (Original) The apparatus of claim 1, further comprising an error correction circuit responsive to the detector and the averaging circuit to provide a signal quality metric that governs which signals are averaged.

(Note: FIG. 17, and col. 13, lines (38-56) in Takashi)

15. In regard to claim 8, Takashi teaches:

- (Original) The apparatus of claim 1, wherein the detector comprises a Viterbi detector.

(Note: FIG. 19, reference character (210) in Takashi)

16. In regard to claim 9, Takashi teaches:

- (Original) The apparatus of claim 1, further comprising a control circuit that determines whether the discrete values are adequately indicated based on comparison of interpretations of new averaged signal and the current signal.

(Note: FIG. 35 and col. 27, lines (41-62) in Takashi)

17. In regard to claim 10, Takashi teaches:

- (currently amended) The apparatus of claim 1, further comprising a control circuit that causes averaging of a defined number of most recent input signals, wherein the defined number is greater than two.

(Note: col. 3, lines (12-17) in Takashi)

18. In regard to claim 11, Takashi teaches:

- (Original) The apparatus of claim 1 further comprising a control circuit that causes the previous signal stored in the buffer to be an averaged input signal when two or more signals are obtained in the retry mode.

(Note: col. 3, lines (12-17) in Takashi)

19. In regard to claim 12, Takashi teaches:

- (Original) A storage device, comprising;

(Note: FIG. 1 in Takashi)

- a storage medium;

(Note: FIG. 1, reference character (54) in Takashi)

- a head assembly operable to generate a read signal from the storage medium;

(Note: FIG. 1, reference characters (53), (59) & (60) in Takashi)

- a buffer that saves the read signal generated by the head assembly;

(Note: FIG. 1, reference character (6) in Takashi)

- a detector that interprets the read signal as discrete values;

(Note: col. 27, line (50) in Takashi)

- an averaging circuit responsive to the buffer and the detector; and

(Note: FIG. 35, reference character (250) and col. 27, lines (50-55) in Takashi)

- a control circuit responsive to the averaging circuit to cause interpretation by the detector in a retry mode of a new read signal comprising an average of a previous read sign stored in the buffer and a current read signal.

(Note: FIG. 35 and col. 27, lines (41-62) in Takashi)

20. Claims 13 and 54 are rejected for the same reasons as per claim 3.
21. Claims 14 and 56 are rejected for the same reasons as per claim 4.
22. Claims 15 and 39 are rejected for the same reasons as per claim 5.
23. Claims 16, 25, 38, 48, 55, 57, 58 and 67 are rejected for the same reasons as per claim 6.
24. Claim 17 is rejected for the same reasons as per claim 7.
25. Claims 18, 29, 41, 51, 60 and 71 are rejected for the same reasons as per



Art Unit: 2133

claim 8.

26. Claims 19, 26 and 68 are rejected for the same reasons as per claim 9.

27. Claims 20, 32, 44, 62 and 74 are rejected for the same reasons as per claim 10.

28. Claim 21 is rejected for the same reasons as per claim 21.

29. Claims 22, 28, 34, 45, 47, 53, 64 and 70 are rejected for the same reasons as per claim 1.

30. In regard to claim 23, Takashi teaches:

- (original) The method of claim 22, wherein interpreting the input signal comprises:
- sampling the input signal;
- storing the sampled input signal; and
- detecting the discrete values in the sampled input signal.

(Note: FIG.1, reference characters (1), (3), (4) & (6) in Takashi)

31. In regard to claim 24, Takashi teaches:

- (original) The method of claim 23, wherein sampling the input signal comprises converting the input signal to a digital signal, storing the sampled input signal comprises storing the digital signal, and multiple signals to be averaged include the stored digital signal.

(Note: FIG.1, reference characters (4) & (6) in Takashi)

32. In regard to claim 27, Takashi teaches:

Art Unit: 2133

- (original) The method of Claim 22, wherein interpreting the input signal comprises using maximum likelihood detection and error correction to provide the discrete values and a signal quality metric, the method further comprising excluding the input signal from the multiple signals to be averaged based on the signal quality metric.

(Note: FIG.1, reference characters (12) & (57) in Takashi)

33. In regard to claim 30, Takashi teaches:

- (original) The method of claim 28, wherein determining whether the discrete values are adequately indicated comprises comparing interpretations of the averaged signal and of the second signal.

(Note: Figures 3 and 35 in Takashi)

34. Claims 31, 43, 61 and 73 are rejected for the same reasons as per claim 30.

35. Claims 33, 50, 63 and 75 are rejected for the same reasons as per claim 11.

36. Claims 35 and 54 are rejected for the same reasons as per claim 2.

37. In regard to claim 36, Takashi teaches:

- (original) The system of claim 34, wherein the means for averaging comprises means for saving a digital read signal before equalization in read channel.

(Note: Figures 3, reference character (26) in Takashi)

38. In regard to claim 37, Takashi teaches:

- (original) The system of claim 36, wherein the means for saving a digital signal comprises means for saving an averaged read signal.

(Note: Figures 3, reference character (6) in Takashi)

- 39. Claim 40 is rejected for the same reasons as per claim 37.
- 40. Claims 42, 49, 59 and 69 are rejected for the same reasons as per claim 27.
- 41. Claims 46 and 65 are rejected for the same reasons as per claim 23.
- 42. Claim 66 is rejected for the same reasons as per claim 24.
- 43. Claim 72 is rejected for the same reasons as per claim 30.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Rizk whose telephone number is (571) 272-8191. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Art Unit: 2133

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronics Business Center (EBC) at 866-217-9197 (toll-free)

Sam Rizk, MSEE, ABD

Examiner

ART UNIT 2133

*[Handwritten signature]*  
12/5/06

*[Handwritten signature]*  
ALBERT DECADY  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100